# TRAUMA VICTIM

## Theoretical Issues

## and

## Practical Suggestions

**Lee Hyer**

**and**

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Chapter 8

# CLINICAL IMPLICATIONS AND APPLICATIONS OF INFORMATION PROCESSING

## MODELS OF POST-TRAUMATIC STRESS DISORDER

Brett T. Litz
and
Diana Hearst

"Consciousness of our powers arguments them." Vauenargues

## INTRODUCTION

The theoretical assumptions, principles, and experimental paradigms of human information processing (cognitive psychology) have greatly contributed to our understanding of the etiology and maintenance of PTSD (Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1989; Foa, Steketee, & Olasov-Rothbaum, 1989; Litz & Keane, 1989). PTSD is uniquely suitable

to be studied from the perspective of experimental cognitive psychology in that the core symptoms of traumatized persons entail disturbances of memory, imagery, and thought; all symptoms that serve as targets of clinical interventions.

The purpose of the present chapter is to introduce the information processing theory of PTSD and set forth general clinical guidelines and heuristics that are implied from the theory that can be useful in the treatment of traumatized persons. To date, the majority of the conceptual work in information processing and PTSD has been used to provide explanatory mechanisms for the formation of PTSD broadly defined rather than to derive clinical interventions for specific problems (for exceptions, see Horowitz, 1986; McCann & Pearlman, 1990; Resick & Schnicke, 1990). Because of this, the proposed general clinical guidelines below are intended to be used to augment existing methods of psychological treatment of PTSD rather than exist as stand-alone interventions. In this context, three broad and related content areas are discussed: first, a series of treatment guidelines are derived from information processing theory (e.g., guidelines are proposed that will facilitate traumatic event[s] processing as in direct therapeutic exposure, etc.); second, the information processing consequences of multiple traumatization (an under-explored area) are explored; and third, information that can be provided to traumatized persons about the high probability information processing sequelae of experiencing an overwhelming life event are discussed.

## BACKGROUND

Information processing refers to a set of empirically derived hypothetical constructs, derived from experimental cognitive psychology, that address how individuals perceive, selectively attend to, and retrieve personally relevant information from memory (see Ingram & Kendall, 1986). Information processing psychology normatively addresses how life experiences are organized in memory in a manner that facilitates the utilization of past experience. Past experience is organized in memory in functional units called networks or schemas. Schemas are constructed highly organized bits of knowledge that typically allow us to effectively utilize our past knowledge about how

our world works in order to respond to the environment in an efficient manner. As will be shown below, information processing theories of PTSD posit that traumatic life experiences are organized in a manner that profoundly influences how new information that is relevant to the trauma is processed. Before describing the specific aspects of information processing in PTSD, the reader is provided with a brief overview of the conceptual underpinnings of such work that is borrowed from experimental cognitive and social-cognitive psychology (see Taylor & Crocker, 1981).

**Schematic Processing**

A key set of empirical findings from information processing research are that perception, the allocation of attention, comprehension, and beliefs about situations are all subject to the biasing effects of what has been called schematic processing (see Winfrey & Goldfried, 1986). Schematic processing facilitates the encoding and retrieval of information in that extra information processing (cognitive and affective) resources are used up for situations or cues that confirm expectations based on prior experience. A corollary to this is that the more *self-relevant* and *emotion-based* the prior knowledge is, the more pervasive, automatic (unconscious), tenacious, and powerful the schematic biasing becomes (e.g., Bargh, 1982; Bower, 1981). Whole volumes have been written on these and related issues and the reader is referred to these for a more thorough rendering (e.g., Clark & Fiske, 1982; Cantor & Kihlstrom, 1981). What follows are some general statements about the effects of schematic processing that will provide a backdrop for a discussion of information processing in PTSD.

A schema is a unique construct in that it refers to both a content (stored, organized knowledge) and a process. In terms of a process, a schema, once activated or cued, is said to quickly direct attention to schema-relevant information in the environment, provides default (fill-in) understanding or meaning for events, scripts or programs for responding emotionally and behaviorally, and influences what is remembered and recalled subsequently about the situation (see Williams, Watts, MacLeod, & Mathews, 1988). A schema is activated by both internally generated (e.g., feeling states reminiscent

of past experience) and external stimuli (situational retrieval cues). Schematic activation also can proportionally lead us, often unconsciously, to disrespect schemainconsistent stimuli. If our schemas lead us to behave a certain way in a situation, we are later likely to be overconfident in the belief that we were correct in our behavior, and be quite resistant to arguments to the contrary (See also Chapter 4).

Modern information processing theory has posited that cognitions, behaviors, and emotional/physiological reactions as response systems flow from the same schematic organization (e.g., Bower, 1981). In this way, information processing is not strictly the study of cognitive events (e.g., memory) but the study of integrated repertoires of organized responses (cognitive, behavioral, and affective). As stated above, research has shown conclusively that these cognitive, behavioral, and physiological effects of information processing are more pronounced and have a greater impact upon experience when the schematic processing is in the context of personally meaningful and emotional material (see Greenberg & Safran, 1989). Traumatic life experiences are, by definition, powerfully self-referent and emotionally significant. The biases in information processing that flow from the schematic processing of trauma-related information are in part responsible for symptom formation in PTSD (Litz & Keane, 1989). These will be described subsequent to a description of the theory of information processing in anxiety disorders that provides the backdrop for work in this area.

**Information Processing in Anxiety Disorders**

Lang (1985) has proposed an information processing theory of fear and anxiety that maintains that fear-relevant stimuli are encoded in highly organized, semantic, "fear networks" in memory (see Chapter 3 also). These fear networks, or schemas contain three types of information: (1) information about stimulus cues that elicit fear; (2) information about cognitive, motor, and psychophysiological responses (e.g., heart rate increases, scripts for behavioral avoidance); and (3) information that defines the meaning of the stimulus cues and responses for the individual (e.g., "I will faint or go crazy unless I escape this situation"). When confronted by a fear-relevant stimulus,

the whole network of memories, responses, attitudes, and beliefs become primed and made more accessible to experience. The network of memories acts like a program for action, emotion, and thought whose integrated function is to marshal resources to cope with expected harm.

Anxiety disordered patients are characterized in Lang's model as having an unusually coherent and stable fear network which requires few matching elements in the environment for the network to be activated. Lang also proposed that subtle and highly generalized (and often ambiguous) events can lead to fear network activation in anxiety disorders because of the increased likelihood that other elements in the network are concurrently active (e.g., being slightly anxious or vulnerable). Anxiety disordered patients are hyper-prepared, so-to-speak, to perceive threat in ambiguous situations and to attend to fear-relevant cues in their environment. Such behavior can obviously be antithetical to adaptive social functioning.

Foa and Kozak (1986) elaborated on Lang's information processing model in an effort to explain processes of fear (symptom) reduction in anxiety disorders which has great relevance to the treatment of PTSD patients. They discussed different ways in which memory structures can be accessed so as to enhance what they called "emotional processing" (see Litz, 1992). Foa and Kozak (1986) proposed that pathological anxiety can change only when the fear network is fully accessed (i.e., emotional processing occurs) and is subsequently altered by exposure to corrective information (see below). (For more thorough explanations of the information processing models of anxiety disorders, the reader is referred to Barlow, 1988; Beck & Emery, 1985; Foa & Kozak, 1986; Hamilton, 1983; Lang, 1985; Litz & Keane, 1989; Williams et al., 1988.) (See also Chapter 3.)

**Information Processing Theories of PTSD**

Horowitz (1986) has proposed a comprehensive model of PTSD that has distinct information processing components. In the model, trauma creates two opposing sets of internal processes called intrusion and denial (or numbing), that signify that the person is naturally trying to cope with and resolve

extreme stressors. The intrusion phase of adjustment following trauma entails the hallmark cognitive and emotional symptoms of PTSD: painful reexperiencing and hyperactivity. Intrusive memory reactivations occur because the organism is motivated by a tendency to completion or closure so that trauma memories can be integrated into existing schemas about the self. Horowitz argued that until a trauma is integrated into a person's schemas it is, in part, present in short-term memory. This process drives the intrusive reexperiencing of traumatic material, a hallmark symptom of PTSD. Such intrusions, however, trigger an opponent process of ideational and affective denial that represents the defensive phase that functions to ward off painful trauma-related affects and memories. This opponent process is emotional numbing that can function to shut down the system and aide in the avoidance of painful memories of the trauma. A PTSD patient shifts from this numbing phase to an intrusion phase, until resolution of the trauma. Resolution, then, entails accommodation of the trauma with the person's schemas of the world and the self. PTSD, therefore, reflects an inability to integrate the trauma due to excessive denial that thwarts the necessary emotional processing. Several other theoretical models of PTSD have incorporated similar information processing factors within a cognitive-behavioral framework. (See also Chapter 3.)

Foa, Steketee, and Olasov-Rothbaum (1989) attempted to extend Lang's fear network model to explain PTSD. They proposed that PTSD develops because of the horrendous nature and powerful intensity of the traumatic conditioning events that occurs during trauma and the attributions used by the person to explain why it happened. They further argued that such experiences, over time, lead to quantitative and qualitative changes in the trauma network or schema that distinguishes its impact on information processing from other organized pieces of self-related knowledge. Foa et al. (1989) specifically posited that the fear network in PTSD is characterized by the intensity of the response elements which produce psychophysiological arousal, the size of the fear structure (its generality), and the ready accessibility of the trauma-related network in memory. These processes lead to faulty and exaggerated beliefs about the probability that dire consequences will once again occur as well as the fact that

PTSD patients have a tendency to process present-day stressors as more severe and "bad" than nontraumatized persons.

A theoretical model proposed by Chemtob et al. (1989) to explain cognition in combat-related PTSD, has drawn heavily from the concepts discussed above and represents a very thorough treatment of the area. They proposed a ***"cognitive-action"*** theory of PTSD which suggests that memory structures are organized in a manner that influences behavior, biases attention, and exacerbates emotional responding in a vicious feedback cycle.

Chemtob et al. (1989) proposed that patients with PTSD typically respond to perceived threat utilizing a survival mode of functioning. This formerly adaptive pattern of behavior (hypervigilance, hyper-reactivity, and a perceptual "readiness" to attend and react to threat or danger cues) is currently represented in memory in a well organized structure (or schema). Similar to Lang's model, the trauma structure includes information about emotions (e.g., anger, dread, panic), plans for action or sequences of behavior (e.g., fight, flee) and associated images and memories of past threatening experiences (e.g., being physical injured). Because information about danger or threat is stored in memory in such a rich multidimensional framework, a host of cues in the environment and in the person can activate memories of the trauma that in turn drive trauma-related behaviors.

Chemtob et al. (1989) posed that trauma schema is always partially activated because some low-level anxiety and arousal always are present in traumatized individuals. The arousal partially primes a PTSD patients to expect threatening events to occur. This occurs because physiological arousal (e.g., fear-related arousal) is part of the trauma-network or schema. For example, PTSD patients have difficulty in thinking they are safe in ambiguous social situations because they are likely to already be anxiously aroused or concurrently have some degree of trauma memory activation. The latter state would then make the PTSD patient feel that something potentially harmful, dangerous, or threatening might occur. When this expectation of threat does exist, the person is motivated to be defensive (e.g., aggressive) or avoidant (e.g., make an attempt

to escape the situation). They also are more likely to focus their attention on threat-salient cues in the environment (e.g., a quick movement in a crowd). Weak or ambiguous evidence of threat both in the environment and internally are used by the information processing system to further potentiate, bias, and select threat-relevant stimuli (at the same time inhibiting alternative, more adaptive behaviors and feelings, from being activated).

The outcome of the processes described above are, in effect, the symptoms that make up PTSD. For example, exposure to a generalized cue in the environment (e.g., a man on a date for a rape-trauma victim) will automatically activate the relevant trauma network leading to increased anxiety, hypervigilance, likely misinterpretation of approach behaviors on the part of the date, an increase in the likelihood of accessing images of the rape scene with corresponding feelings, and a conscious effort to avoid. Some of these processes are unconscious, however. For example, a rape victim might be on the one hand engaging in a conversation and trying to smile at a man whom she is genuinely attracted to, and be unaware that she is averting her gaze, covering parts of her body, being very tense, etc. As time passes, more and more internal retrieval cues are present (e.g., feelings associated with the trauma), more aversive memories get primed, more environmental stimuli are interpreted as threatening, and other more adaptive schemas are less influential in determining behavior (e.g., networks about what to do on a date when you are attracted to someone). However, further active suppression of the recall of such painful cues (e.g., distracting one's thoughts) coupled with active behavioral avoidance (leaving the scene) serve to reduce arousal and thus reduce the presence of these retrieval cues. In this manner full and sustained exposure to the trauma network is thwarted which serves to maintain symptoms.

Most forms of PTSD treatment target some aspect of the processes described above. Retrieval cues that trigger symptoms can be made less effective by exposure therapies (Keane, Fairbank, Caddell, & Zimering, 1989; Keane & Kaloupek, 1982) and reactions to such triggers can be made more effective and functional by skills based approaches that foster better

coping (e.g., Keane, Fairbank, Caddell, Zimering, & Bender, 1985). Pharmacological interventions are designed, in part, to reduce the feedback produced by arousal mechanisms that provide powerful priming information and serve to reinforce meaning/belief systems that safety is not possible (Friedman, 1991). What follows are more specific treatment suggestions that are borne from the information processing models.

## INFORMATION PROCESSING IN THE TREATMENT OF PTSD

The essential ingredients of the successful treatment of PTSD, according to the information processing models, include accessing the trauma network (through some method of direct therapeutic exposure), allowing for changes in the organization of the stored information by introducing new and corrective response and meaning elements (see Foa & Kozak, 1986). A post-treatment goal would be to transform the trauma network in a way that makes the response elements greatly reduced in intensity and produces new programs or propositions that prompt more flexible, distanced, and controlled responding (rather than the speedy and automatic schematic processing). A variety of corrective experiences for PTSD patients serve to alter the trauma network, for example, gradual and repeated exposure to stimulus, response, and meaning elements of the trauma network with the intention of extinguishing the severity of the conditioned response (e.g., through direct therapeutic exposure in vivo or in imagery). Expectations and beliefs like "the pain will never go away" or "I will go crazy if I don't avoid these memories" are similarly challenged experientially by reductions in arousal through exposure treatments. Over time then, stimuli that are reminiscent of the trauma, more general life stressors and ambiguous social stimuli are coped with more effectively because the trauma network is less predominant in information processing.

The meaning of events need to be similarly transformed. Most treatments of PTSD make formerly tacit trauma-related beliefs *verbally explicit* thereby allowing for changes in those meaning elements. This is accomplished by first accessing the trauma network allowing for more thorough and experiential processes to unfold. Second, when patients are experiencing

feelings associated with the trauma in therapy, or remembering certain aspects of what happened to them, the therapist can more readily elicit the belief system or meaning elements that have been induced from traumatization. Once verbalized, such beliefs can be subject to reality testing. Patients also should be actively engaged to monitor their own information processing in stressful situations and trained to test out the veracity of those beliefs. Rigid and automatic schematic expectations are acknowledged and over time evidence supporting them become less and less available. The more experience someone has at challenging their trauma-related beliefs in the absence of re- victimization, the more the trauma network can change to accommodate the new more adaptive information. McCann and Pearlman (1990) have outlined some of the changes that occur in such schematic processes during this process of accommodation. They argue for example, that after treatment trauma victims should have beliefs that reflect realistic attitudes about once being a victim and now being a survivor, etc.

**Cognitive Processing Therapy**

To date, Resick and Schnicke (1990) are two of only a handful of therapists who have specifically developed a treatment package for PTSD (in this case for rape victims) that focuses exclusively on information processing variables. Their package highlights some of the mechanisms that were just described. In their cognitive processing therapy (CPT) they specifically address faulty thinking patterns that are posited to be directly causing anxious arousal and avoidance in rape-related PTSD. In the first phase of CPT considerable time is devoted to educating rape victims about the characteristic ways rape trauma effects fundamental beliefs and attitudes about the self and the world (see Janoff-Bulman, 1989). These beliefs are central to the development of symptoms. For example, if you believe that the world is no longer safe-enough or that no one can be trusted, then you will be terrified in new social situations and feel like your only option is to escape (Foa et al., 1989).

The second phase of CPT is akin to the stress inoculation approach to the treatment of PTSD (Foa, Olasov-Rothbaum,

Riggs, & Murdock, 1991) in that an emphasis is on changing maladaptive selftalk (or verbal scripts). The assumption here is that the statements PTSD patients say to themselves keep them from taking risks in their environment and this thwarts opportunities for corrective learning experiences that would serve to change those faulty beliefs. Some examples of the characteristic modes of maladaptive and extreme thinking that serve as target in CPT are (1) I can never feel safe again, (2) the only way I can regain a sense of control is to stay away from men, (3) danger is always lurking, and (4) I was naive to trust and my judgments are no longer sound.

Treatment entails the forming of new, more adaptive schemas about the social world. Again, schemas are most effectively changed if the faulty schema is accessed, rigorously and systematically challenged over time, and new corrective responses and meaning elements introduced based on success experiences (See Chapter 6 for a description of these strategies). Faulty schemas are accessed in group therapies where members explore the meaning behind their trauma (meaning elements are accessed) and current- day reactions to events are linked back to the things learned from the trauma. Members of groups learn to systematically challenge faulty thinking patterns once they are exposed experientially. Cognitive processing therapy also uses homework assignments that get patients to actively explore and challenge the manner in which they think and to monitor their emotional and behavioral reactions to significant events. The CPT approach, along with the stress-inoculation approach used by Foa and her colleagues, has been shown to be particularly effective in the treatment of rape related PTSD (see Foa et al., 1991).

Thus far the theoretical mechanisms that have been proposed to explain the development and maintenance of PTSD have been addressed as well as how these mechanisms can be used to conceptualize the change process. A specific example of a treatment (CPT) that specifically targets cognitive processes in traumatized individuals also has been described. The interventions derived from the information processing models have been used typically to treat one discreet type of trauma that occurs in adulthood (e.g., rape or combat trauma). To date, no information processing model has addressed the

effects of multiple traumatization across the life span and the unique treatment needs of those so afflicted. The next section is a brief exploration of these issues.

## INFORMATION PROCESSING AND MULTIPLE TRAUMATIZATION

What happens to information processing mechanisms when a history of multiple traumas exist? Unfortunately, no theory has attempted to explain the effects of multiple traumatic events on information processing. Yet this task is essential due to the very high incidence of multiple traumatic events across the lifetime. Issues about how multiple traumas may interact in memory are next discussed by using an example of a Vietnam veteran who experienced physical and emotional abuse by his father before entering the military, where he was subsequently traumatized by his combat experiences.

As shown in Figure 8.1 traumas can have intersecting or overlapping stimulus (S), response (R) and meaning (M) elements. Thus unique and shared aspects of traumas are stored in memory. The patient described in Figure 8.1 had a history of severe physical abuse and subjugation in childhood by his father, before he entered the military. In Vietnam, among other things, he was caught in an ambush, was pinned down, observed the death of a close buddy, and was wounded himself. The overlapping features of the two sets of memories are shown in the intersection of the two circles; this intersection is labeled the ***trauma complex.***

Multiple traumatization has several information processing implications. Having multiple traumas in memory makes internal and external cues or reminders a lot easier to activate or prime traumatic schemas. The more frequently and developmentally early traumatic events occurred, the greater the variety and intensity of the emotional reactions, defensive maneuvers, and intrusive memories become primed. Developmentally early traumas, however, are not easily (fully) accessed and consciously recognized because they entail extensive and highly automatic programs for defensive responding

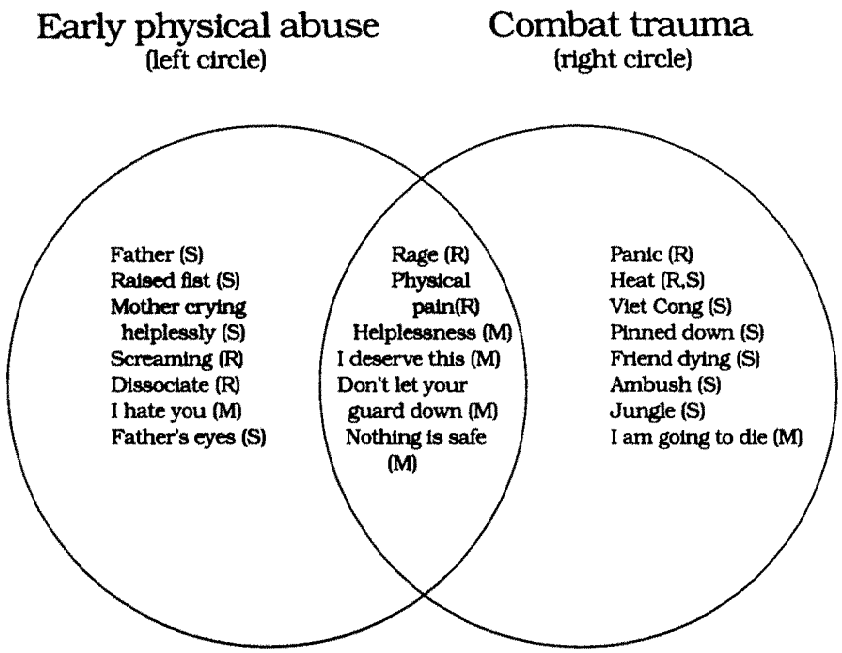


**Figure 8.1.** An example of distinct and overlapping features of trauma memories (the trauma complex).

(dissociation, severe emotional withdrawal) that thwarts full access. In addition, sufficient retrieval cues may be lacking during therapy (Litz & Keane, 1989).

The more developmentally early the traumas are that contribute to the trauma complex, the more fundamental and far-reaching the meaning elements become. Gross distortions in fundamental beliefs and assumptions about such issues as safety and trust (e.g., "I can't protect myself from harm and people will betray me"), selfesteem (e.g., "I am bad"), intimacy ("I can't be soothed or comforted by anyone") or power (e.g., "I do not have any control over things that happen to me") have a profound effect on how a person takes care of self in response to current day demands and stress. Needless to say, these types of beliefs need to be accessed, verbally acknowledged, and modified in treatment.

In our treatment experience with Vietnam veterans, often the most recent traumas have pre-eminence in social information processing. This observation is consistent with current thinking about the accessibility of schemas (see Higgins & King, 1981). Moreover, axiomatically when the more frequent and vivid recent traumas are processed in therapy, then the more accessible the earlier traumas become. This is due to the more frequent retrieval of trauma-complex cues that over time more readily prime and access developmentally early memories of extreme stress and victimization.

In the treatment context, a therapist should assume a *direct link* between a more recent trauma and earlier traumas. When a patient is describing his/her most recent trauma in the context of strong primary affects (e.g., rage, terror) and meaningrelated themes (e.g., worthlessness, noncontrol, a lack of safety, or a sense of deserving bad things), they should (depending on the nature of the relationship, and depending on the current egostrength of the patient) look for linkages with early events that, by definition, would be traumatic and need to be explored in treatment.

A helpful procedure for a therapist may be to sketch out a *Venn diagram* like the one depicted in Figure 8.1, (or time

line as in Chapter 4) and fill-in stimulus, response, and meaning elements derived from their work with patients on a recent trauma and begin to hypothesize response and meaning elements that make up the trauma complex. Assessment information derived from initial evaluations about childhood and developmental history can be used as a guide. (See also Chapter 4.) In the example depicted in Figure 8.1, a determination was made from the initial assessment and history taking that this patient had a very punitive father who was physically abusive. Meaning elements that were present when the patient described his Vietnam trauma provided ready cues for the therapist to explore the patients relationship to his dad which then facilitated the retrieval of formerly inaccessible and unconscious trauma memories of his father's brutal and humiliating treatment of him, that in turn would activate memories of his military experiences. Over time this patient was able to understand that his unique adaptation to combat was greatly colored by his schema about himself in relation to his dad. He also was able to make connections between some of his feelings during the combat trauma and his experiences with his dad (the trauma complex).

Whether the therapeutic intervention is general psychotherapy or direct therapeutic exposure, one can ask the following questions to patients that will serve to facilitate linking most recent (and most accessible) traumas to earlier ones (1) "When have you felt this way before?" (2) "As you are saying to yourself that you feel _____ when you think about what happened to you, can you go back in your memory to a time that you felt a similar way?" Similarly, therapists can take advantage of the priming that naturally occurs when a more recent traumatic memory is accessed in therapy by getting patients to focus on response and meaning elements that, based on assessment data, can be linked with earlier experiences (stimulus elements are more likely to be distinct and will be less effective at cuing the trauma complex). Finding such linkages and accessing early traumas (if they are present) in order to facilitate emotional processing and exposure to any number of types of corrective information is essential for effective treatment.

## PROVIDING INFORMATION TO PATIENTS ABOUT TRAUMA RELATED INFORMATION PROCESSING

One of the things that brings traumatized persons to seek help is that they are naturally wanting to make sense out of their experience. If not explicitly stated, questions such as why is this happening to me, why can't I get this terrible thing out of my mind?, etc., should be implicitly assumed. As suggested in earlier chapters of this book, an essential task in working with PTSD patients, whether implementing symptom or problem-focused interventions or when targeting the changes that have occurred at the level of assumptions and beliefs about the world or the self, is to facilitate a collaborative enterprise. This working relationship is in part fostered by using a shared language system and a shared set of assumptions or a conceptual model about trauma and change. An important therapist function is to provide a conceptual model, geared toward the patients specific context, providing information about the universal effects of trauma and what recovery might look like over time.

The assumption is that providing a model to patients does two things; (1) assists the victim in making sense out of what happened to them, that is, their trauma(s); and (2) helps each one contextualize the trauma process from trauma to symptoms. Symptoms can be seen as natural adaptations to extreme stress and the mind's attempt, on the one hand, to protect the person from additional harm and, on the other, to heal and work-through the painful memories that are left of the incident(s). In addition, providing accurate information about treatment itself allows the recovery process to unfold in logical, sequential ways. In addition, this also will increase compliance and motivation for the arduous tasks ahead.

The following are brief descriptions derived from information processing theory that can serve as a guide to clinicians. To provide simple and concrete descriptions of these information processing mechanisms is extremely helpful. In keeping with the theme of this chapter, the intention is to provide information that will be helpful to any clinician working with traumatized

populations regardless of the specific type of interventions used.

### Storage of Traumatic Memories and Their Effects

Patients can be taught that trauma is an experience that unpredictably and uncontrollably shatters or violates assumptions about the fundamental aspects of human experience (e.g., that he/she has a reasonable sense of predictability and control over events, that the world is not inherently dangerous, etc., see Janoff-Bulman, 1989). Quite naturally, the event gets stored in memory along with any emotional reactions as well as what the event means to the person. The network of trauma memories is easily activated and once activated has a profound affect on behavior. Traumatic memories can be activated by several different methods: Physical reminders or cues, emotions or other physiological reactions related to original trauma, and through thinking or imagining trauma-related information. When the trauma network is activated, powerful emotions, similar to the ones that occurred during the trauma, are primed, making experiencing and expressing other types of emotions difficult (emotional numbing). Traumatic memories resurface when reminders are present; and the more a person (understandably) avoids and suppresses thoughts and feelings about what happened, the greater the likelihood that trauma-related images, thoughts, and feelings will resurface without intention in the form of intrusive thoughts and nightmares.

### Selective Attention, Over-interpretation of Threat, and Misattribution of Anxious-arousal

PTSD patients can be taught how researchers have shown that traumatic events force individuals to see their environment as more threatening than it may be objectively, and how, when one has PTSD, the tendency is to interpret social situations as less safe than they need to be. When exposed to situations that are subtly reminiscent of their trauma, PTSD patients are likely to be anxious because the memories that are activated are frightening and the negative feelings are typically used by the person to confirm their beliefs that something is dangerous around them.

### Completion Tendency

A helpful procedure is to explain to patients that a natural tendency for humans is to seek mastery, completion, or closure from traumatic experience. Two processes compete for their emotional resources: (1) the mind's natural attempts to recover from the terrible events via the resurfacing of memories that require resolution and (2) a tendency to avoid, stuff, or suppress these painful feelings and memories. This competition can use patients up and make them less able to concentrate or engage interpersonally.

Reexperiencing is directly proportional to the extent of avoidance and suppression that occurs. The greater the suppression and avoidance, the more frequent and intrusive the reexperiencing. In this way, suppression of traumatic memories never works in the long run. The suppressed memories will always come back in one form or another. Therapy entails the slow, careful, and deliberate disclosure and reactivation of painful memories so they can be accessed and then modified.

### Exposure to Corrective Information

Patients can be instructed that trauma memories are very painful but inherently unharmful. What needs to happen in therapy is for the memories to be accessed and explored in order to provide opportunities for exposure to corrective experiences. Patients also should be taught that the longer the time since their trauma memories have been accessed, the more painful exposure will be. They also are likely to have more and more memories return to them as time passes. This too is natural and to-be-expected. Memories need to be accessed before they can be changed in a manner that facilitates closure and recovery from trauma. Once accessed, several curative features can occur; feelings associated with the trauma are less and less intense over time, the person can call up the memories voluntarily, reminders are less effective at cuing memories, among others. Finally, the changes in meaning and beliefs that occurred since the trauma can be altered and that in a way fosters more adaptive functioning.

## SUMMARY

The conceptual model of human information processing has greatly aided our understanding of PTSD. To date, however, few information processing theories have posed specific treatment guidelines. The present chapter was intended to provide an overview of how information processing psychology has been used to conceptualize PTSD. The position taken in this chapter has been that an understanding of the various models and an attention to information processing in treatment can facilitate or augment most forms of clinical work with traumatized populations. General guidelines were described to help clinicians in their assessments (e.g., exploring with patients the stimulus, response, and meaning elements of their traumatic exposure during interviews) and in treatment (e.g., accessing trauma networks in exposure therapy and eliciting meaning elements experientially). A way of thinking about the effects of multiple traumatization on information processing was explored, something that previous work in this area has failed to address. And finally, specific areas of information processing were offered that can be shared with patients to facilitate accurate expectations about trauma, PTSD, and the recovery process.

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